

## A New Variety, *Scabiosa japonica* var. *breviligula* (Dipsacaceae) from Tokai District, Central Japan

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(Received on June 14, 2004)

A new variety, *Scabiosa japonica* var. *breviligula*, is described. This has some remarkable distinct characteristics such as small heads that have no or shorter ligulate florets. It is endemic to Tokai District in Honshu, Japan.

**Key words:** Dipsacaceae, Japan, new variety, *Scabiosa japonica* var. *breviligula*, taxonomy.

A peculiar population of *Scabiosa* (Dipsacaceae) was found at Tsugeno, Horai-cho, Minamishitara-gun, Aichi Prefecture in 1994. These plants seemed to be closely related to *S. japonica* var. *japonica* f. *japonica*, but some remarkable characteristics, such as very slender habit, smaller heads with fewer numbers of florets and no ligulate florets were obviously distinct from those of var. *japonica*. In field and herbarium observations and cultivation of these plants, this population was revealed to be clearly different from the other infraspecific taxa of *S. japonica*. Other populations in Tokai District have now been found which have the same characters. Consequently, we would like to propose a new varietal taxon, *S. japonica* Miq. var. *breviligula* Suyama & K. Ueda here.

***Scabiosa japonica*** Miq. in Ann. Mus. Bot. Lugd.-Bat. III: 113 (1867).

var. ***breviligula*** Suyama & K. Ueda, var. nov. [Fig. 1]

Haec varietas nova *Scabiosae japonicae* var. *japonicae* f. *japonicae* affinis. Habitus

quam in var. *japonica* f. *japonica* gracilior. Capitula exigua, 1–2 cm diametro quam in var. *japonica* f. *japonica* pauciflora, sine floribus ligulatis vel interdum floribus nonnullis cum ligulis brevibus. Corolla perpallidae-violacea. Involucellum fructuum cylindricum, ca. 3 mm longum, villosum, longitudinaliter 8-nervatum, in parte superiore corona brevi membranacea. Setae calyces 5, 1–2 mm longae.

**Type:** JAPAN, central Honshu. Aichi Prefecture: Maruyama, Nakauri, Shinshiro-shi (34°50'59.33"N, 137°32'05.99"E, WGS84, alt. 138 m. 13 Oct. 2001, C. Suyama 1801, holotype, KANA207915).

Short-lived monocarpic perennial herbs, mostly two or three years before fruiting and perishing, with simple main root. Plants more slender than f. *japonica*. Cauline leaves pinnate to pinnatifid, radical leaves pinnatifid. Synflorescence 30–100 cm, cymose with small leaves, terminated in a capitulum. Heads 1–2 cm in diameter, clearly smaller than in f. *japonica*, without ligulate florets or sometimes with 3–5(–7) shortly ligulate florets (Figs. 2C, D). Florets

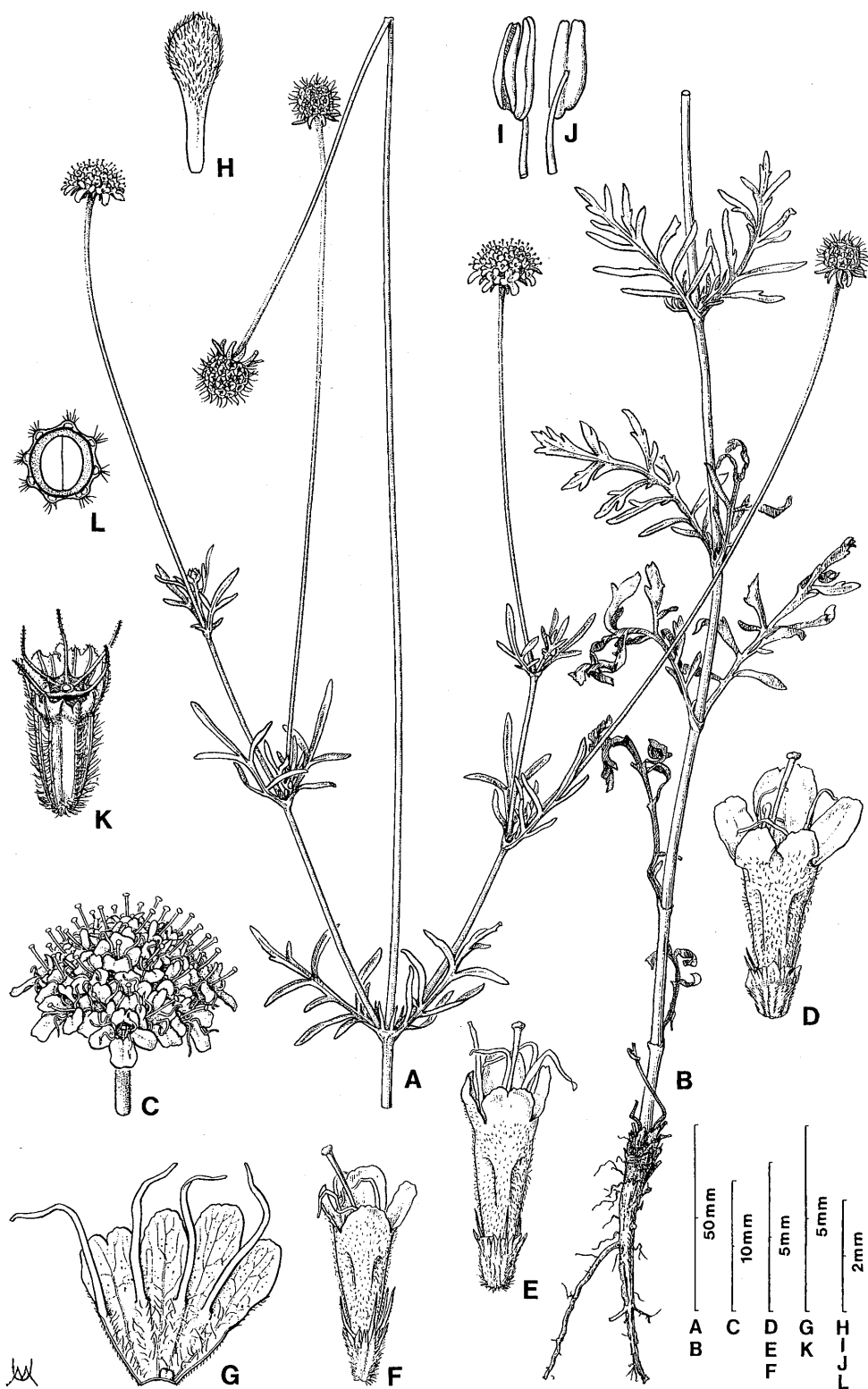


Fig. 1. *Scabiosa japonica* Miq. var. *breviligula* Suyama & K. Ueda. A, B: Habit. C: Head. D: Outer floret (Note its short lobe). E, F: Inner floret (E: middle part of head, F: center). G: Inner side of inner floret; H: Receptacular bract. I, J: Anther (I: adaxial, J: abaxial). K: Fruit. L: Transection of fruit. Drawn from Suyama 1801 (Holotype: KANA207915).

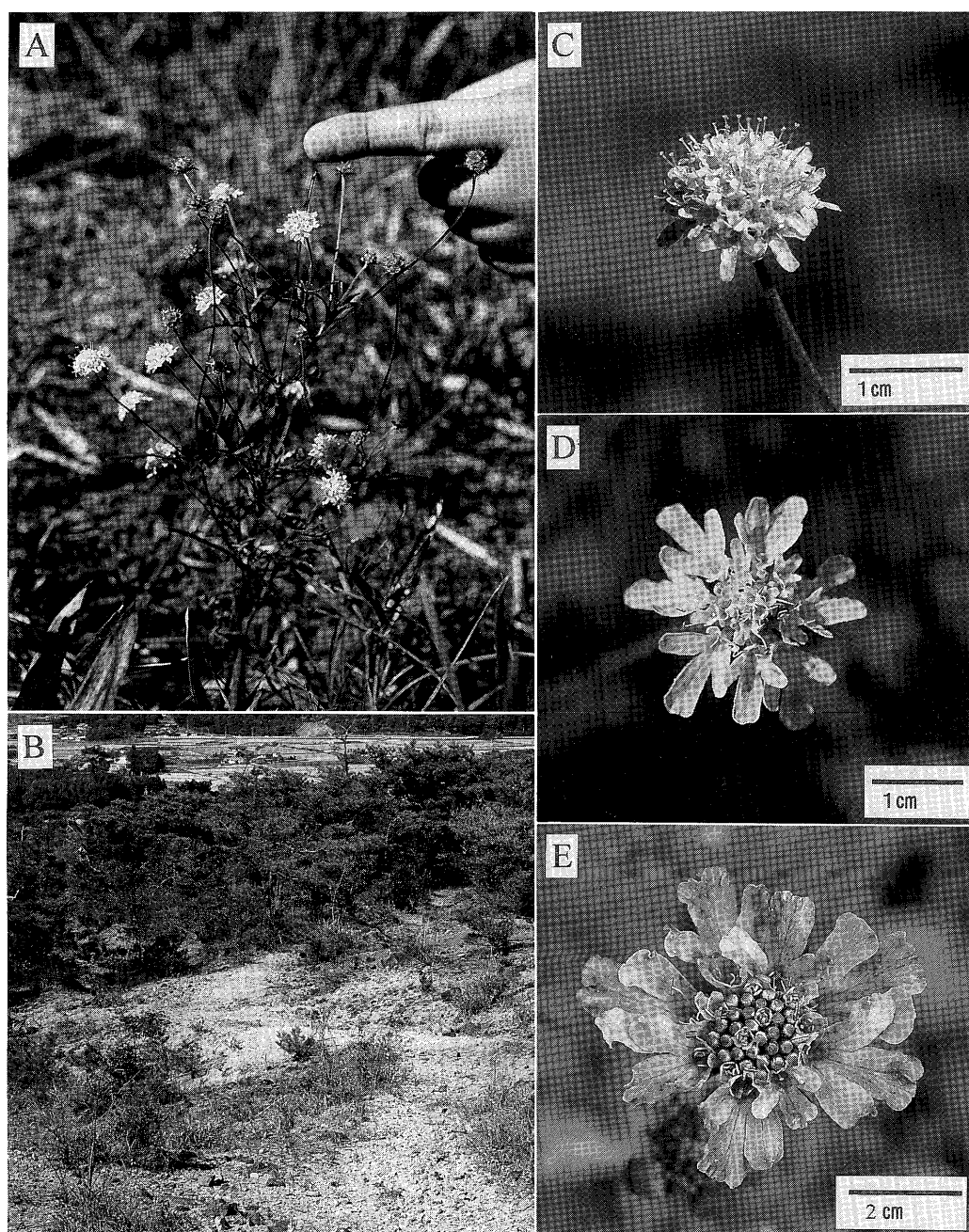


Fig. 2. A: Habit of *Scabiosa japonica* var. *breviligula*. B: Type locality (Mt. Maruyama, Nakauri, Shinshiro-shi, Aichi Pref.). C, D: Heads of *S. japonica* var. *breviligula*. E: Head of *Scabiosa japonica* var. *japonica* f. *japonica*.

4–6 mm in length, ca. 15–30(–50) per head, clearly fewer than in *f. japonica*. Corolla pale violet. Flowers in August to November. Involucre (epicalyx) cylindrical, ca. 3 mm long, villous, longitudinally 8-grooved, forming a short membranous corona in the upper part. Calyx perennating, 5-bristled, 1–2 mm long.

Chromosome number:  $2n = 16$ . This count was made from root tips on Suyama 000611B (collected from Mt. Tonmakyama, Inasa-cho, Inasa-gun, Shizuoka Pref.) cultivated at the Botanical Garden of Kanazawa University.

Japanese name: Mikawa-matsumushiso (nov.).

#### Key to the varieties:

1. Heads (2.5–)4–5 cm in diameter, with 6–16 long ligulate florets. Florets (30–)60–100(–160) per head. Calyx bristles longer than 2 mm long
2. Calyx bristles 2–4 mm long..... var. *japonica*
2. Calyx bristles 4–6 mm long ..... var. *alpina*
1. Heads 1–2(–3.5) cm in diameter, without ligulate florets or sometimes with 3–5 (–7) short ligulate florets. Florets ca. 15–30(–50) per head. Calyx bristles 1–2 mm long ..... var. *breviligula*

**Distribution and habitat:** The plants grow in sunny open grassland or gravelly places. Field and herbarium research revealed that var. *breviligula* is confined to lowland and hilly land (altitude 20–600 m) of Tokai District (Aichi, Gifu, Mie and the western part of Shizuoka Prefectures), in contrast to var. *japonica f. japonica* that is widely distributed from southern Hokkaido to Kyushu (Fig. 3).

It is especially abundant in Eastern Mikawa Province (east end of Aichi Prefecture) (Fig. 4). In this region, *f. japonica* is found in the mountainous regions on the

right bank areas of the River Toyogawa (above 600 m in elevation), and var. *breviligula* is confined to the hilly region of the left bank areas (below 600 m) (Fig. 4). In some specimens from Aoyama-kogen (Mie Pref.: N. Okamura, 1997, 8 Sep., KYO; C. Suyama 1505, KANA) and Nukata-cho (Aichi Pref.: Y. Fukuoka 2074, TNS; C. Suyama 1808, 1809, KANA), the size of heads and the number of ligulate florets are somewhat larger. These specimens were seen as the morphologically intermediate between *f. japonica* and var. *breviligula*. In our field research in both these areas, we could find only populations that show intermediate form. A specimen which showed the typical morphology of var. *breviligula* was collected in Ena-shi in 1998 (Gifu Pref.: GPM-B15583). We suppose that this is the northern distribution limit of var. *breviligula* but we could not find it in our field survey and only *f. japonica* and the intermediate form were found. There were some records of *Scabiosa* plants at Okazaki-shi and Isle of Mikawa-Oshima in some reports of the local flora of Aichi Prefecture (Ohara 1971, 1985), but we could not find this population, and no voucher specimens were preserved.

#### List of Specimens Examined

[Herbarium abbreviations: TMNH-B: Toyohashi Museum of Natural History (Toyohashi-shi, Aichi Prefecture); Horaiji: Horaijisan Natural History Museum (Horai-cho, Aichi Pref.); GPM-B: Gifu Prefectural Museum (Seki-shi, Gifu Pref.). Others were followed by Index Herbariorum ed. 8.]

***Scabiosa japonica* Miq. var. *breviligula* Suyama & K. Ueda**

**Aichi.** Shinshiro-shi: Uritoge (T. Tsunekawa 20, TMNH-B5397, TMNH-B; T. Tsunekawa 76, TMNH-B5450, TMNH-B; K. Torii 22219-1, Horaiji), near Uritoge (K. Torii, 23 Sep. 1952, KYO), Nakauri (K. Torii TNS280399, TNS), Sone, Nakauri (K. Torii 6971, Horaiji), Fudoudaira, Tomioka (K. Torii 25716-1, Horaiji); Minamishitara-gun: Tsugeno, Horai-cho (K. Torii 3547, Horaiji; K. Torii 3638-1, Horaiji), ca. 220 m (C. Suyama 439, 937, KANA), Yoshikawa-

touge, Horai-cho (K. Torii 22217, Horaiji; S. Kitamura & G. Murata 277, KYO); Toyohashi-shi: Takashihara (T. Tsunekawa, TMNH-B16065, TMNH-B), between Kisshouzan and Yotsuya (T. Tsunekawa, TMNH-B5994, TMNH-B), Ishimaki-cho (T. Tsunekawa 1487, TMNH-B8880, TMNH-B), Magoshi, Ishimaki-cho (K. Torii 7959, Horaiji; T. Tsunekawa 4400, TMNH-B4782, TMNH-B), Yotsuya, Ishimakihagihira-cho (K. Torii 7971-1, Horaiji). Gifu. Ena-shi: Motate, Kusumi, Nagashima-cho 480 m (N. Futamura, GPM-B15907, GPM-B), Gomyou, Iiji-cho 670 m (N. Futamura, GPM-B15583, GPM-B); Toki-shi: Jigetsutouge, Jyourinji ca. 300 m (K. Inami, GPM-B12711, GPM-B); Toki-shi: Tokitsu-cho ca. 150 m (K. Inami, GPM-B23110, GPM-B).

**Shizuoka.** Inasa-gun: Mt. Tonmakuyama, Tonmaku, Inasa-cho 400 m (Y. Kurosawa 162, TNS), Mt. Ubusan, Mikkabi-cho 272 m (C. Suyama 1806, 1807, KANA).

**Mie.** Ayama-gun: Aoyamakougen, Oyamada-mura (N. Okamura, 8 Sep. 1997, KYO); Ichishi-gun: Aoyamakougen, Hakusan-cho ca. 770 m (C. Suyama 1505, KANA).

**Scabiosa japonica** Miq. var. **japonica** f. **japonica** in Tokai District

**Aichi.** Minamishitara-gun: Kamogaya, Tsukude-mura (K. Torii, 16 Sep. 1951, KYO), between Kamogaya and Yuanami, Tsukude-mura (G. Murata 13271, KYO), Mt. Horaijisan (M.T., 10 Sep. 1940, TI); Nukata-gun: Hagsaka-touge, Oojiro, Nukata-cho (Y. Fukuoka 2074, TNS; C. Suyama 1808, 1809, KANA); Nishikamo-gun: Minamiyama (T. Ito 891, TNS); Hoi-gun: Hongusan, Ichinomiya-cho (K. Torii 22220, Horaiji; T. Tsunekawa 234, TMNH-B10457, TMNH-B), Miyajisan (K. Torii, 6 Sep. 1953, KYO); Kitashitara-gun: Iyama, Inabu-cho (K. Torii 1362-1, Horaiji), Ikenotaira, Mikuniyama, Inabu-cho (K. Torii, 11 Sep. 1960, TI), Mennoki, Inabu-cho 1100 m (C. Suyama 1465-1467, KANA), Shimizu, Shitara-cho (K. Torii, 23 Sep. 1961, KYO), Komagahara, Shitara-cho (K. Torii 1917-1, Horaiji; T. Tsunekawa, TMNH-B4271, TMNH-B), Shimizutarusaka, Nishinagura, Shitara-cho (K. Torii 1688-1, Horaiji), Ichibaguchi, Kawamukai, Shitara-cho (K. Torii 1774-1, Horaiji), Higashinagura, Shitara-cho (K. Torii 1662-2, Horaiji; K. Torii, 23 Sep. 1965, TI), Iguchi, Tsugu-mura, (K. Torii 22216, Horaiji), Futanoshima, Tsugu-mura (K. Torii 25715, Horaiji), Ochiata, Tsugu-mura (K. Torii

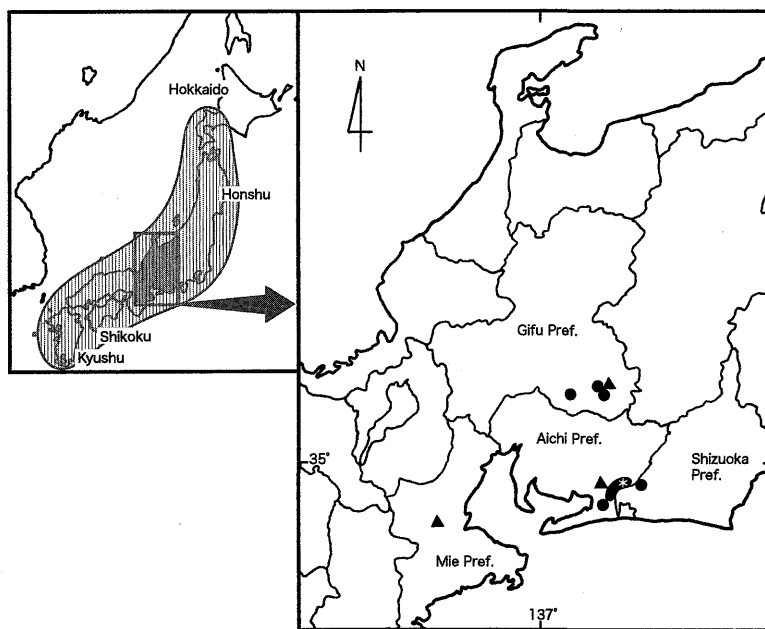


Fig. 3. Distribution of *Scabiosa japonica* var. *japonica* and var. *breviligula*. Hatched area: var. *japonica*. ● and black area: var. *breviligula*. \*: type locality of var. *breviligula*. ▲: intermediate populations between f. *japonica* and var. *breviligula*.

25714, Horaiji), Between Tsugu-mura and Kobayashi, Touei-cho (K. Torii 2704, Horaiji), Arai, Shimokurokawa, Toyone-mura (K. Torii 362, Horaiji), Shinnotouge, Toyone-mura (K. Torii 555, Horaiji), Mt. Chausuyama, Toyone-mura (K. Torii 22213, Horaiji), 900–1000 m (S. Mimoro & al 2097, KYO).

**Nagano.** Shimoina-gun: Lake side of Chausuyamako, Mt. Chausuyama, Neba-mura 1250 m (C. Suyama 1462–1464, KANA).

**Gifu.** Mashita-gun: Ookano, Hebinoo, Gero-cho 620 m (N. Futamura, GPM-B8359, GPM-B), Oono, Kadowasa, Gero-cho 610 m (N. Futamura, GPM-B3577, GPM-B), Chuuji, Ohora, Kosaka-cho 680 m (N. Futamura, GPM-B3579, GPM-B); Ena-shi: Southeastern side of Mt. Oneyama, Gomyou, Iiji-cho 647 m (C. Suyama 1790–1794, KANA).

### Discussion

Three infraspecific taxa have previously been recognized in *Scabiosa japonica* Miq. (1867) based on the differences in their mor-

phologies and habitats (Takeda 1935, Hara 1940, Nakai 1943). *Scabiosa japonica* var. *japonica* f. *japonica* is rather common in the highlands of Honshu, Shikoku, and Kyushu. On the other hand, f. *littoralis* Nakai (1943) is very rare and is restricted to rocky seashores in Kanto District (Chiba, Kanagawa, and the eastern part of Shizuoka Prefectures). Var. *alpina* (Takeda) Takeda (1935) grows in subalpine gravelly open areas of Honshu and Shikoku.

*Scabiosa jezoensis* Nakai (1943) occurs in Hokkaido and the northernmost part of Aomori Prefecture, Honshu. This has consistently been recognized as a variety of *S. japonica*, namely, *S. japonica* var. *acutiloba* H. Hara (1940) (Kitamura et al. 1979, Kitamura 1981, Yamazaki 1993, Suyama and Ueda 2001).

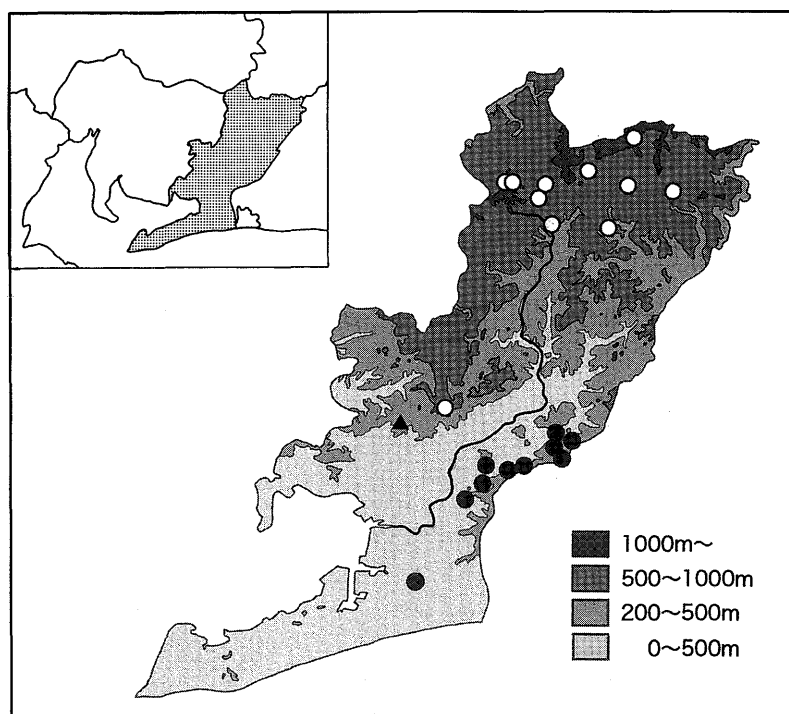


Fig. 4. Distribution of *Scabiosa* at Eastern Mikawa Province (eastern end of Aichi Pref.). ○: *S. japonica* var. *japonica* f. *japonica*; ●: var. *breviligula*; ▲: intermediate form between f. *japonica* and var. *breviligula*. Bold line shows the River Toyogawa.

From a viewpoint of habitat, *f. littoralis* is a lowland population as in the case of var. *breviligula*. However, the morphology of *f. littoralis* is clearly different from the latter. Heads of *f. littoralis* are larger than var. *breviligula*, with long ligulate flowers as in *f. japonica* and the leaves are rather thickened.

The type locality of var. *breviligula*, Mt. Maruyama, Aichi Prefecture (Fig. 2B), is a serpentine hill where the vegetation is very sparse, but other localities of this variety are not restricted to the serpentine areas (Geologic map Toyohashi 1: 200,000).

Seeds of var. *breviligula* collected from the type locality have been cultivated using normal soil. The number of coronas per head of the plants was fewer than in natural populations, and heads had no ligulate florets. However, the plants became somewhat taller and had slightly larger numbers of heads than in the natural plants (Yoshida pers. comm.). It is commonly known that high content of heavy metal ions in the serpentine soil causes morphological modification to plants such as dwarfism (Kitamura 1950, Yamanaka 1952). In this case, however, the characteristics of flower morphology of these plants were little changed by soil condition. Accordingly it is suggested that var. *breviligula* is not a dwarf plant of var. *japonica* caused by serpentine soils, but a distinct taxon that essentially has unique morphological characteristics.

In conclusion, the morphology of the new taxon is apparently distinct from the other infraspecific taxa of *S. japonica*, although there are a few morphologically intermediate populations. The habitat is confined to lowlands and hilly lands, in contrast to the other infraspecific taxa that grow in alpine areas, highlands or seashores. Furthermore, its distribution area is only a small part of the whole distribution of *S. japonica*. Consequently, we proposed this taxon as a new variety, *S. japonica* var. *breviligula*.

We considered that var. *breviligula* is one

of the 'Tokai hilly land elements' (Ueda 1989). That is, possible past distribution area of *Scabiosa* plants during the cooler period had been more wide, and var. *breviligula* might be the relict population.

We are indebted to Dr. Y. Iwatsubo for the chromosome number counting. Thanks are due to Mr. Y. Yoshida for valuable information of var. *breviligula*, and Mr. M. Umebayashi for preparing the illustrations. We would like to express our thanks to Dr. R. K. Brummitt and Dr. M. Thomas for their invaluable comments on a manuscript. Our gratitude are also extended to the curators of KYO, TI, TNS, Gifu Prefectural Museum, Horaijisan Natural History Museum and Toyohashi Museum of Natural History for allowing us to study specimens. We also thank to Aichi Prefectural Shinshiroshitara regional office, Inabu town office, Inasa town hall, and Shinshiro city office for giving us the permission to collect specimens. This study was partly supported by the Sasakawa Scientific Research Grant from The Japan Science Society (No. 13-192).

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# 須山知香, 植田邦彦: マツムシソウ (マツムシソウ科) の新変種ミカワマツムシソウ

筆者の一人須山は, 1994年に愛知県南設楽郡鳳来町黄柳野の野外調査を行っていた際に, マツムシソウに似た奇妙な植物を発見した. この集団を新分類群として認める見解に至ったので, これをマツムシソウの新変種ミカワマツムシソウ *Scabiosa japonica* Miq. var. *breviligula* Suyama & K. Ueda (Fig. 1)として命名・記載した.

## マツムシソウ: 変種の検索表

- A. 頭花は直径 (2.5–)4–5 cm, 6–16 の長い舌状花を持つ; 小花数は (30–)60–100(–160); 萼刺は長さ 2 mm 以上
- B. 萼刺は長さ 2–4 mm.....マツムシソウ
- B. 萼刺は長さ 4–6 mm.....タカネマツムシソウ
- A. 頭花は直径 1–2(–3.5) cm; 舌状花はないか, あるいは 3–5(–7) 個の短い舌状花を持つ; 小花数は 15–30(–50); 萼刺は長さ 1–2 mm.....ミカワマツムシソウ

ミカワマツムシソウは東海地方 (愛知, 岐阜, 三重, 静岡西部) の低地・丘陵地のみに分布し (Fig. 3), 特に東三河地方 (愛知県東部) の丘陵地に多数生育することがわかった (Fig. 4). この地方においてマツムシソウとミカワマツムシソウは接近して分布しているものの, 両者は生育環境によって明瞭にすみ分けている.

マツムシソウ *Scabiosa japonica* Miq. は日本固有の草本植物で, 形態や生育地の差によりこれまで種内に 3 分類群が報告されている (中井 1943, 武田 1935). 今回新たに報告するミカワマツムシソウは, 頭花が小型で舌状花を持たないかあるいは短いものを少数持つ (Fig. 2C, D) という特徴により, 他のマツムシソウ種内分類群から区別できる. マツムシソウの海岸型であるソナレマツムシ

ソウは, ミカワマツムシソウと同様に低地に生育しているが, その形態と分布は明らかに異なる. 東三河地方には, 小規模な蛇紋岩地が散在しており, そこにミカワマツムシソウが見られることが多い. 蛇紋岩地は土壤に重金属が多く含まれ, 植物の矮小化等の形態変化が生じやすいことが知られている (北村 1950, 山中 1952). しかし, 生育地は必ずしも蛇紋岩地のみに限られてはいない (地質図 豊橋 1: 200,000). また, 基準産地で採集した種子を, 通常の土壤に播種育成したところ, 2–3 年で開花した. これらの栽培品は自生地に比べて植物全体がやや大型になり頭花を多数付けたものの, 基準産地と同様に頭花当たりの小花数は少なく, 舌状花は無いか短いものが少数あるというミカワマツムシソウに特異な花の形質は変化しなかった (吉田 私信). このことから, 本種はマツムシソウが単に蛇紋岩地で矮小化したものではなく, 固有な形態形質の特徴を遺伝的に保持している集団であることがわかる.

このように, ミカワマツムシソウは, マツムシソウとは形態が明らかに異なるものの, マツムシソウと区別の付きにくい中間型も幾分存在すること, 高山帯・山地帯・海岸に生育する他の種内分類群とは異なり, その生育環境が低地・丘陵地であること, そしてその分布域はマツムシソウ種群全体の内, 周伊勢湾地域というごく限られた部分であることから, ミカワマツムシソウはマツムシソウの変種として位置づけるのが妥当であると判断した.

このミカワマツムシソウは, かつて冷涼な気候の時代ではより広域に生育していたマツムシソウ属植物の残存集団であり, 東海丘陵要素 (植田 1989) の一つとして考えている.

(金沢大学大学院自然科学研究科)